

MAINTENANCE

5-1. INTRODUCTION

This section contains periodic maintenance and performance test procedures for the multichannel power amplifier. It also contains a list of test equipment required to perform the identified tasks.

NOTE

Check your sales order and equipment warranty before attempting to service or repair the unit. Do not break the seals on equipment under warranty or the warranty will be null and void. Do not return equipment for warranty or repair service until proper shipping instructions are received from the factory.

5-2. PERIODIC MAINTENANCE

Periodic maintenance requirements are listed in Table 5-1. Table 5-1 also lists the intervals at which the tasks should be performed.

Table 5-1. Periodic Maintenance

TASK	INTERVAL	ACTION
Inspection Cables and Connectors	12 Months	Inspect signal and power cables for frayed insulation. Check RF connectors to be sure that they are tight.
Performance Tests	12 Months	Perform annual test per paragraph 5-5.

5-3. TEST EQUIPMENT REQUIRED FOR TEST

Test equipment required to test the amplifier is listed in Table 5-2. Equivalent test equipment may be substituted for any item, keeping in mind that a thermistor type power meter is required.

NOTE

All RF test equipment must be calibrated to 0.05 dB resolution. Any deviation from the nominal attenuation must be accounted for and factored into all output readings.

Table 5-2. Test Equipment Required

MENCLATURE	MANUFACTURER	MODEL
Signal Generator	Agilent (H.P.)	ESG4433B
30 dB Attenuator, 250 Watt	Tenuline	
Spectrum Analyzer	H.P.	8562E
Coax Directional Coupler	H.P.	778D
Power Meter / Sensor	H.P.	437B / 8481A
Network Analyzer	H.P.	8753D
Current Probe		
Source Diskette	Powerwave	

5-4. PERFORMANCE TEST

Performance testing should be conducted every 12 months to ensure that the amplifier system meets the operational specifications listed in table 5-3. Also verify system performance after any amplifier module is replaced in the field. The test equipment required to perform the testing is listed in table 5-2, and the test setup is shown in figure 5-1.

5-4.1. AMPLIFIER PERFORMANCE TEST.

To perform the test, proceed as follows:

1. Connect test equipment as shown in figure 5-1.

NOTE

Do not apply any RF signals at this time.

AMPLIFIER SPURIOUS EMISSIONS TEST:

2. Load the MFRM waveform on the ESG (signal generator). Apply this signal through a driver amplifier to the MCPA so that the RF signal going into the MCPA is approximately -1.5 dBm (adjust the input RF signal level to get 48.5 dBm output power). Measure spurious emissions. Verify that it is within specification.

GAIN TEST:

3. Set input power level to power amplifier at -1.5 dBm (869, 881, and 894 MHz).
4. Measure the output power in dBm.
5. Subtract input power (in dBm) from output power (in dBm) to get gain.
6. Check the amplifier gain across the band from 869 MHz to 894 MHz. Gain should be 50 ± 2 dB. Record test data in table 5-3.

INPUT RETURN LOSS TEST:

7. Read and record the S_{11} return loss measurement on network analyzer. Record test data in table 5-3.

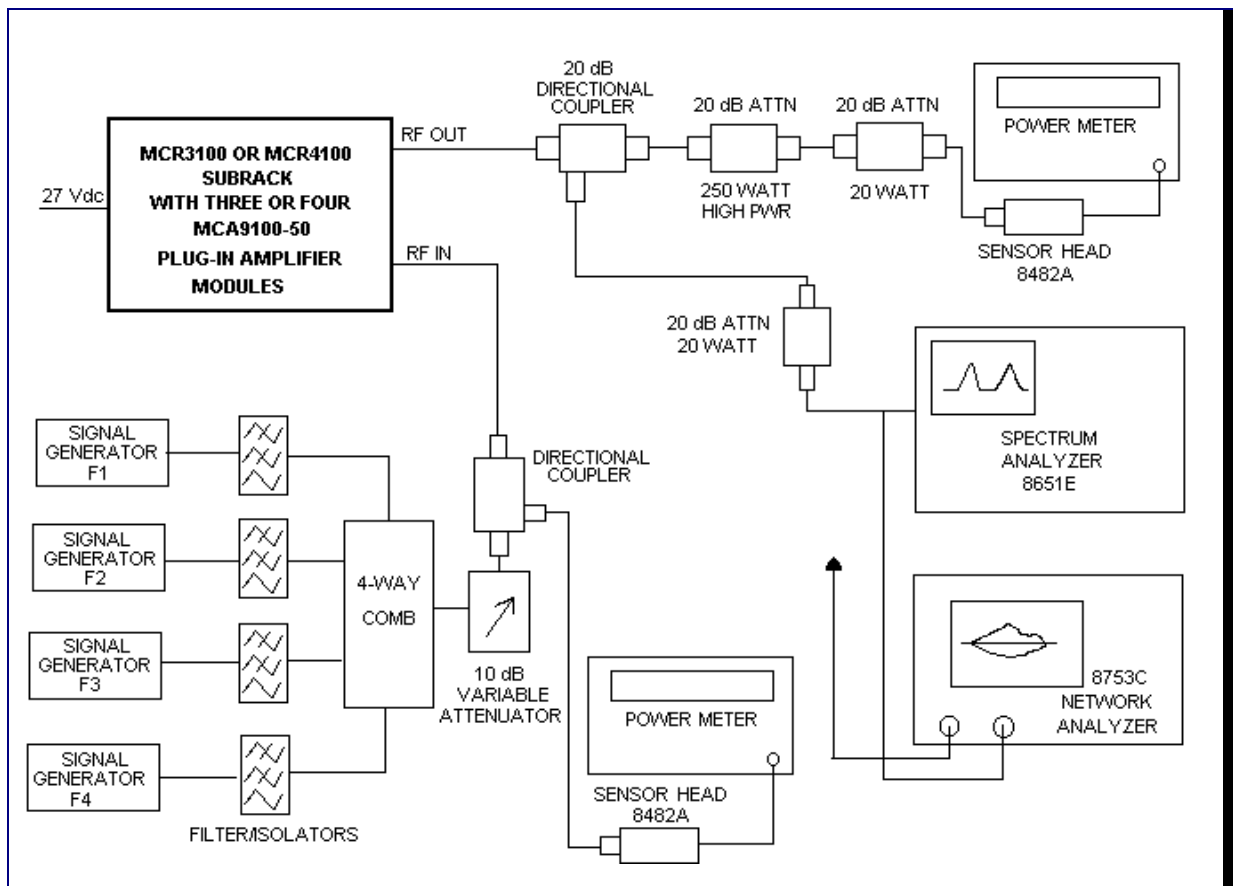


Figure 5-1. NTGY71AA Amplifier Test Setup Diagram

Table 5-3. Multichannel Power Amplifier NTGY71AA Test Data Sheet

Tested By: _____ Serial No: _____

Pass/Fail: _____ Date: _____

70W MCPA Test

Test Conditions: Load and source impedance: **50 ohms, VSWR < 1.2:1**
Supply voltage: **(+26) Vdc ± 0.1 Vdc** (unless otherwise noted).

Network Analyzer Span: **25 MHz**

Marker #1 = 869 MHz, #2 = 881 MHz, #3 = 894 MHz

TEST	CONDITION	MIN	MAX	FREQUENCY (MHz)		
1.00	NETWORK ANALYZER			869	881	894
1.01	Gain	49.5dB	50.5dB			
1.02	Gain Flatness	0 dB	±0.2 dB/ 1.25 MHz			
1.03	Input Return Loss, worst case In band		-14 dB			
1.04	Output Return Loss, worst case In band		-14 dB			
2.00	CDMA TESTS					
	3 CDMA TONES: @ 70W out					
	• Spec. Ana. With 10 MHz Res. BW					
2.01	D @ +1.5MHz		-61 dBc			
2.02	D @ -1.5MHz		-61 dBc			
2.03	Current @ 70 W (48.5 dBm) out		23.4A			
3.00	RMS Power Detection					
3.01	RMS reading in Watts @ Pout = 48.5 dBm	-0.5dB	+0.5dB			
3.02	RMS reading in Watts @ Pout = 43.5 dBm	-0.5dB	+0.5dB			
4.00	ALARM TESTS					
4.01	Excessive DC Voltage (>27 V)		Check			
4.02	Verify Over Power Alarm (>51 dBm for >3 sec)		Check			
4.03	FWD PWR Voltage (4.26V @ 48.5 dBm)		Check			
4.04	REV PWR Voltage (4.26V @ 48.5 dBm)		Check			
5.00	FIRMWARE VERSION		2.05			

5-5. FIELD REPLACEMENT OF THE MODULE

The NTGY71AA multichannel power amplifier module can be replaced in the field on site by a qualified technician with experience maintaining RF power amplifiers and similar equipment.

To replace a power amplifier module, proceed as follows:

1. Turn off 26 Vdc power to that specific module.
2. Disconnect the two RF cables and connectors P1 through P5.
3. Remove 13 screws that secure amplifier module to heat sink.
4. Carefully remove amplifier module from heat sink.
5. Add Thermstrate thermal interface pad to surface of replacement amplifier which mates with heatsink.
6. Install replacement in reverse order of steps 1 through 4 above.